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Patentanmeldung Nr. Patent application No. Demande de brevet n°

99203347.2

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Blatt 2 der Bescheinigung
Sheet 2 of the certificate
Page 2 de l'attestation

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Koninklijke Philips Electronics N.V.
5621 BA Eindhoven
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Automatic channel numbering system for TV system

The invention relates to a method and device for allowing receivers to automatically number the channels in accordance with channel numbers broadcasted by broadcasters. In particular this system is intended for DVB Terrestrial systems, where a receiver may receive services from different transmission stations with a sometimes changing service situation, or where a receiver may be moved to a new location (portable or mobile).

It is, inter alia, an object of the invention to provide an automatic channel numbering system. To this end, the invention provides a method and a device as defined in the independent claims. Advantageous embodiments are defined in the dependent claims.

These and other aspects of the invention will be apparent from and elucidated with reference to the embodiments described hereinafter.

The broadcasters (sometimes called service provider as there is a growing distinction between the business of broadcasting and the business of providing information to viewers) are assumed to broadcast information about preferred channel numbers of the services they supply. Also all services they broadcast are supposed to be tagged with information about the country, the network that transmits the service, and the services shall each have a unique id (service_id) in order to determine which services are the same and which are different. In particular any services which are received through multiple paths (from different networks or from multiple transmitters in the same network) will be detected automatically as being identical by the receiver in a stage before the procedures described below. It is assumed that only one of these equivalent services (e.g. the one with the best quality reception) is selected as a candidate for entry in a receiver channel list (a numbered list of services).

Key issues in the described system embodiment are:

☐ The system automatically assigns the best matching channel order in view of country and regional preferences of the viewer.

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PHN 17.693 EP-J

2

14.10.1999

- ☐ The method deployed in the receiver to use information in the broadcasts to discriminate between broadcasts originating from different countries (discriminated by `original_network_id`) to improve user selection
- ☐ The method deployed in the receiver to use information in the broadcasts to discriminate between broadcasts originating from different networks (discriminated by `network_id`) to improve regional coherence in the service list.
- ☐ The method deployed to keep the list as constant as possible for the user in the situations of changing network configurations, changing location of the receiver, or changing reception conditions, by remembering previous services and looking for "replacement" services. The same method makes the receiver robust against any form of accidental removal of a service as long as such an error is restored timely.

Broadcaster rules:

- Different broadcasters operating within one country can elect to choose one channel numbering scheme amongst each other, probably in conjunction with appropriate co-ordinating authorities. This specification defines the logical channel number concept for conveying such channel numbering information to receivers. Broadcasters should obey the following specification rules in order for receivers to be able to properly operate.

- Logical channel numbers allocated should be useable directly as channel numbers in a set. Therefore large gaps in assigning channel numbers or the use of 3 digit numbers should be avoided.

Within the scope of one network, logical channel numbers shall be allocated uniquely.

- Services with the same `original_network_id/service_id` shall have the same `logical_channel_number`. When defining regional variants of a service the same `logical_channel_number` can be used (e.g. in neighbouring networks). This facilitates defining a consistent and compact national / regional / local channel numbering scheme as well as indicates to the receiver that services with the same `logical_channel_number` are similar (regional variants).

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Manufacturer rules:

It is a manufacturer option to provide an automatic channel numbering facility on the basis of logical channel numbers. However when the manufacturer supports logical channel numbers for automatic channel numbering he shall comply to the following rules:

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EP99203347.2

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PHN 17.693 EP-F

14.10.1999

When a receiver service list is first initialised the receiver shall perform in accordance with the following rules:

1. It shall attempt to allocate the services to a channel number equal to the

5 logical_channel_number for that service. This rule implies that if there is only one service with a particular logical_channel_number available it shall (initially) be allocated to this channel number.

2. It shall resolve any conflict between services that use the same logical channel number.

– National Preference: It is recommended to give preference to services of one

10 original_network_id when allocating channel numbers in case of a conflict (effectively implementing a country preference).

– Regional preference: Since networks shall broadcast non-conflicting logical channel numbers the receiver may choose to give preference of one network over the other (effectively implementing a certain regional preference) in assigning services to channel numbers. It may

15 also assume that services with the same logical_channel_number are regional variants as long as they have the same original_network_id.

3. It is recommended to keep services from the same network that cannot be assigned to their logical_channel_number grouped together in the channel list. It is recommended to preserve any ordering information among such services.

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In case some services do not have an associated logical_channel_number they shall get lowest priority in the assignment of a channel number. The only exception is an original_network_id preference, which allows a receiver to first allocate channel numbers to all channels of an original_network_id before allocating channel numbers of any other original_network_id.

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After first initialisation, the user may modify the channel number allocation to set it according to his/her personal preference.

Re-initialising:

30 It is recommended that the receiver provides a function to re-initialise the channel list as if it was first initialised.

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Adding a new service:

- In case a receiver decides to add a new service to the channel list it shall first try to allocate a channel number according to the replacement service rules (see under network re-configuration). Then according to its preferred channel number. In case of a conflict it should
- 5 try to allocate a free channel number.

Removing a service:

- In case the receiver decides a service can be removed from the channel list it will visibly delete the service and its channel number from the channel list. It shall preserve the
- 10 information about the removed service in case a replacement service is found later (see below) to allow such a replacement service to take the place of the removed service in the channel list. This sticky mechanism also improves the robustness of the receiver against network SI errors (wrongfully signalled deletion of a service) or otherwise mistakenly removed services.

15 Network re-configuration:

- When the receiver detects a service offer change including the addition and deletion of multiple services and/or networks it shall first remove all services it can (positively) determine are to be permanently removed from the channel list and then add the new services. Where possible the receiver shall attempt to find suitable replacement services for those services
- 20 (previously) removed from the channel list applying the following replacement service rules:
1. The receiver shall first try match a new service (successor service) to a logical_channel_number + network_id + original_network_id from a service previously removed from the channel list.
 2. Any remaining new services shall be allowed to replace services of other networks no
- 25 longer available (match only on logical_channel_number + original_network_id), taking into account rule 2 as in a first initialisation (use national and regional preference) to select the most suited candidate.

- Any new services that remain after replacement service rules have been applied shall be
- 30 assigned in accordance with the channel allocation rules as mentioned under "first initialisation", but shall not change already existing channel number allocation. Such services may take any free position in the channel list, thereby potentially using the channel number of a removed service that might be replaced later and thus blocking such a future replacement. Receiver manufacturers should attempt to minimise such events.

PHN 17.693 EP-?

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It should be noted that the above-mentioned embodiments illustrate rather than limit the invention, and that those skilled in the art will be able to design many alternative embodiments without departing from the scope of the appended claims. In the claims, any reference signs
5 placed between parentheses shall not be construed as limiting the claim. The word "comprising" does not exclude the presence of elements or steps other than those listed in a claim. The word "a" or "an" preceding an element does not exclude the presence of a plurality of such elements. The invention can be implemented by means of hardware comprising several distinct elements, and by means of a suitably programmed computer. In the device
10 claim enumerating several means, several of these means can be embodied by one and the same item of hardware. The mere fact that certain measures are recited in mutually different dependent claims does not indicate that a combination of these measures cannot be used to advantage.

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EP99203347.2

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PHN 17.693 EP-P

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CLAIMS:

1. An automatic channel numbering method for use in a broadcast signal receiver substantially as described hereinbefore.
2. A broadcast signal receiver substantially as described hereinbefore.
- 5 3. An automatic channel numbering method comprising the step of:
automatically assigning a channel order in view of country and regional preferences of a viewer.
- 10 4. A method as claimed in claim 3, wherein information in received broadcasts is used to discriminate between broadcasts originating from different countries to improve user selection.
5. A method as claimed in claim 3, wherein information in received broadcasts is
15 used to discriminate between broadcasts originating from different networks to improve regional coherence in the service list.
6. A method as claimed in claim 3, wherein a channel numbering list is kept as
constant as possible for the user in the situations of changing network configurations,
20 changing location of the receiver, or changing reception conditions, by remembering previous services and looking for replacement services.
7. A broadcast signal receiver, comprising:
means for automatically assigning a channel order in view of country and
25 regional preferences of a viewer.

PHN 17.693 EP-P

7

14.10.1999

ABSTRACT:

The invention provides a mechanism for allowing broadcast receivers to automatically number the channels in accordance with channel numbers broadcasted by broadcasters. Key issues in the described system are:

- 5 ☐ The system automatically assigns the best matching channel order in view of country and regional preferences of the viewer.
- ☐ The method deployed in the receiver to use information in the broadcasts to discriminate between broadcasts originating from different countries (discriminated by original_network_id) to improve user selection.
- 10 ☐ The method deployed in the receiver to use information in the broadcasts to discriminate between broadcasts originating from different networks (discriminated by network_id) to improve regional coherence in the service list.
- ☐ The method deployed to keep the list as constant as possible for the user in the situations of changing network configurations, changing location of the receiver, or changing reception conditions, by remembering previous services and looking for "replacement" services. The
- 15 same method makes the receiver robust against any form of accidental removal of a service as long as such an error is restored timely.

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